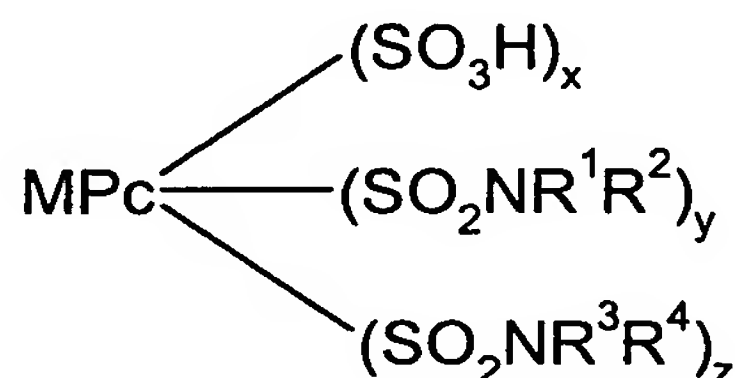


Claims

1. A process for forming an image on a substrate comprising applying an ink thereto by means of an ink-jet printer wherein the ink comprises a liquid medium and a phthalocyanine dye fraction obtainable by the fractionation of a solution and/or suspension of a mixture of phthalocyanine dyes of Formula (1), and salts thereof, by cross-flow filtration:



Formula (1)

wherein:

M is 2H, copper or nickel;

Pc represents a phthalocyanine nucleus;

R<sup>1</sup> and R<sup>3</sup> independently are H or optionally substituted C<sub>1-4</sub>alkyl;

R<sup>2</sup> and R<sup>4</sup> independently are H or optionally substituted hydrocarbyl; or

R<sup>1</sup> and R<sup>2</sup>, and, R<sup>3</sup> and R<sup>4</sup>, independently, together with the nitrogen atom to which they are attached represent an optionally substituted aliphatic or aromatic ring system;

x is 0 to 3.9;

y is 0 to 3.9;

z is 0.1 to 4; and

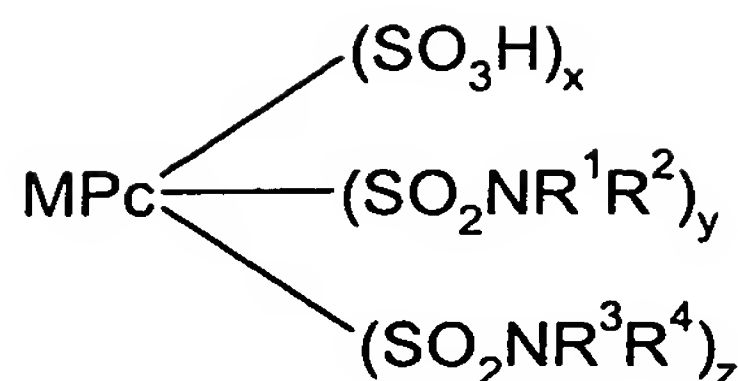
the sum of (x+y+z) is 2.4 to 4.5.

2. A process according to claim 1 wherein the substrate is paper.

3. A process according to either claim 1 or claim 2 wherein the substrate is photographic quality paper.

4. A process according to any one of the preceding claims wherein the ink has a viscosity of less than 20cP at 25°C; contains less than 500ppm in total of divalent and trivalent metal ions (other than any divalent and trivalent metal ions bound to a component of the ink); contains less than 500ppm halide ions; and has been filtered through a filter having a mean pore size below 10μm.

5. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1) M is Cu.
- 5 6. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1)  $R^1$ ,  $R^2$ , and  $R^3$  are all H and  $R^4$  is hydroxyethyl.
7. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1)  $R^3$  is H,  $R^4$  is carboxyphenyl and y is 0.
- 10 8. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1)  $R^3$  and  $R^4$  are both H and y is 0.
9. A process according to any one of the preceding claims wherein the cross-flow filtration membrane is an ultrafiltration membrane.
- 15 10. A process according to claim 9 wherein the ultrafiltration membrane has a nominal molecular weight cut-off in the range of from 5,000 to 500,000.
- 20 11. A process according to either claim 9 or claim 10 wherein the ultrafiltration membrane has a nominal molecular weight cut-off in the range of from 20,000 to 100,000.
12. A process according to any one of the preceding claims wherein cross-flow filtration is through a series of 2 or more membranes.
- 25 13. A printed substrate obtainable by means of a process as described in any one of claims 1 to 12.
14. A printed substrate according to claim 13 which comprises paper.
- 30 15. A printed substrate according to either claim 13 or claim 14 which is a photographic quality print.
16. An ink-jet printing ink that comprises:
- 35 i) a phthalocyanine dye fraction obtainable by the fractionation of a solution and/or suspension of a mixture of phthalocyanine dyes of Formula (1) and salts thereof by cross-flow filtration :



Formula (1)

wherein:

- 5           M        is 2H, copper or nickel;  
              Pc       represents a phthalocyanine nucleus;  
              R<sup>1</sup> and R<sup>3</sup> independently are H or optionally substituted C<sub>1-4</sub>alkyl;  
              R<sup>2</sup> and R<sup>4</sup> independently are H or optionally substituted hydrocarbyl; or  
              R<sup>1</sup> and R<sup>2</sup>, and, R<sup>3</sup> and R<sup>4</sup>, independently, together with the nitrogen atom to which  
 10           they are attached represent an optionally substituted aliphatic or aromatic ring  
              system;  
              x is 0 to 3.9;  
              y is 0 to 3.9;  
              z is 0.1 to 4; and  
 15           the sum of (x+y+z) is 4; and

(ii) a liquid medium:

- 20           wherein the ink has a viscosity of less than 20cP at 25°C; contains less than  
              500ppm in total of divalent and trivalent metal ions (other than any divalent and trivalent  
              metal ions bound to a component of the ink); contains less than 500ppm halide ions; and  
              has been filtered through a filter having a mean pore size below 10μm.

- 25           17.       An ink-jet printer cartridge comprising a chamber and an ink wherein the ink is in  
              the chamber and the ink is as defined in claim 16.